

Remarks

The Applicants have amended Claim 16 to include the subject matter of Claim 20. Claim 20 has accordingly been cancelled. The Applicants have also amended Claim 16 to correct a typographical error. Claim 21 has been amended to depend upon Claim 16 in view of the cancellation of Claim 20.

Claim 16 has further been amended to delete “after” and insert “then.” Thus, the last several lines of Claim 16 now recite that evacuation of the resin is stopped and then the reinforcing fiber substrate is heated up to a resin curing temperature.

The Applicants respectfully request that the above changes and cancellations be entered into the official file inasmuch as they cancel one of the claims, remove at least one rejection and do not raise any new issues for consideration or search inasmuch as the subject matter under examination has not changed.

All of the claims stand rejected under 35 USC §103 over the hypothetical combination of Kimura with Sewell. The Applicants note with appreciation the Examiner’s detailed comments hypothetically applying the combination against those claims. The Applicants respectfully submit, however, that irrespective of the importation of teachings from Kimura into Sewell, Sewell fails to provide an underlying disclosure that would or could lead one skilled in the art toward the claimed subject matter. Reasons are set forth below.

The rejection frankly acknowledges that Sewell does not disclose heating the substrate up to a resin curing temperature. Thus, the rejection turns to Kimura. However, the Applicants respectfully submit that there are additional deficiencies with respect to the Sewell disclosure. One particular deficiency is discussed in detail below. That deficiency is directed to the further acknowledgement

that Sewell does not disclose a specific measurement of first fiber volume content. The Applicants agree.

Instead, the rejection points to paragraph [0007] for the teachings of a target fiber volume content of at least 60%. The rejection thus concludes “as such, the first fiber volume content of Sewell ‘478 must be lower than 60%, which concludes the claimed ranges of 45 to 60% and 45 to 55%.”

Apparently this conclusion is based on the teachings of paragraph [0020] which discusses that the vacuum applied to the mold cavity 110 forces the bladder 106 against the composite structure and thereby forces the composite structure against the tool surface 104 and, by removing excess resin, the mold produces composite structures that have a lower resin volume, a lower per ply thickness and a high fiber volume, and wherein a subsequent removal of excess resin and minimization of ply thickness implies an initial fiber volume content not lower than a final “(target)” volume content. While the Applicants have no disagreement with the reliance on paragraphs [0007] and [0020], the Applicants respectfully submit that those paragraphs, as well as the balance of the Sewell disclosure, fail to provide enough disclosure to allow one skilled in the art to conclude that the first fiber volume content would be lower than 60%. This is because the rejection does not consider the important point that the preform expands when the matrix resin is impregnated into the preform.

In other words, because the matrix resin stays in the interlayer or between fibers of the layered product against the pressing force trying to increase the fiber volume content of the preform, the volume of the preform increases by the volume of the impregnated matrix resin. By discharging the excessive resin from this condition, the fiber volume content can be increased. However, in paragraph [0020] of Sewell, the comparison of the molded material after discharge of the excessive

resin with “a lower resin volume” or “a lower per ply thickness” is at the point in the process immediately before discharge of the excess resin, not at the point in the process with the preform before the pressing force of bladder 106 due to evacuation is applied. The Applicants thus respectfully submit that Sewell does not provide an actual “apples-to-apples” comparison, but instead provides an “apples-to-oranges” comparison because the comparisons look to different points in the process to establish the fiber volume content. The Applicants thus respectfully submit that the rejection is inapplicable on this basis alone.

However, there is more. As described above, Sewell discloses that the target fiber volume content after passing through the steps of (a) pressing force of bladder 106 due to evacuation (increasing the fiber volume content), (b) impregnating matrix resin (decreasing the fiber volume content) and (c) discharging excessive resin (increasing the fiber volume content) is 60%. However, although it is described in steps (a) to (c) that the fiber volume content increases or decreases depending on the step, it merely indicates that the fiber volume content is higher or lower as compared to the prior step. It is, however, not disclosed whether the first fiber volume content of the preform at a stage before the step (a) is higher or lower than 60%. In other words, Sewell is nonenabling with respect to determining how much the cumulative amount of increases or decreases there are over the three steps. The total amount of change could result in a final increase or it could result in a final amount of decrease. There simply is no way to tell.

Because the rejection only considers the descriptions of steps (a) and (c) and only considers steps for increasing the fiber volume content, the rejection concludes that the first fiber volume content of the preform is lower than 60%. However, because the discussion is limited to the fiber volume content increasing/decreasing in steps (a) to (c) relative to the prior step without reference to

how much of an increase or decrease, it is not possible to determine whether the first fiber volume content of preform is higher or lower than 60% from the description of Sewell.

The Applicants have clarified that the first fiber volume content of the preform is lower than a target fiber volume content and is in a range of 45 to 60%. It is thus apparent that the first fiber volume content of the preform is lower than a target fiber volume content. However, in sharp contrast, there is simply no way to tell what the first fiber volume content of the preform is relative to the target fiber volume content. The disclosure is simply inadequate and is thus nonenabling because one skilled in the art would not be able to determine whether there is a net increase or a net decrease. Thus, even if one skilled in the art were to hypothetically combine Kimura with Sewell, the result of that combination would still be indeterminate. Withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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